



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/136,680	08/19/1998	CHRISTOPHE J. CHEVALLIER	703.032US1	2027

7590 07/16/2003

RUSSELL D SLIFER
SCHWEGMAN LUNDBERG WOESSNER & KLUTH
P O BOX 2938
MINNEAPOLIS, MN 55402

EXAMINER

NGUYEN, LUONG TRUNG

ART UNIT	PAPER NUMBER
----------	--------------

2612

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/136,680

Applicant(s)

CHEVALLIER, CHRISTOPHE J.

Examiner

LUONG T NGUYEN

Art Unit

2612

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 December 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 16 December 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/27/2003 has been entered.

Response to Arguments

2. Applicant's arguments filed on 4/29/2003 have been fully considered but they are not persuasive.

In re page 7, Applicant argue that Applicant can not find the feature “a patterned conductive layer adapted to electrically interconnect areas of the monolithic substrate, the patterned conductive layer including: a level of protective material fabricated over the array of non-volatile memory cells for blocking the light received by the CMOS image sensor so that the trapped charged is not erased from exposure to the light” in Schmidt or Zhou, either alone or in combination.

In response, regarding claim 1, the Applicant amended claim 1 with the limitation “a patterned conductive layer adapted to electrically interconnect areas of the monolithic substrate, the patterned conductive layer including: a level of protective material fabricated over the array of non-volatile memory cells for blocking the light received by the CMOS image sensor so that

the trapped charged is not erased from exposure to the light.” The Examiner considers that claim 1 as amended still do not distinguish from Schmidt patent in view of Zhou et al. patent. Schmidt discloses the photocard can be placed on a single integrated circuit, and the device fabricated using a CMOS process allows both processing devices and light sensing devices to be fabricated on a single chip (a monolithic substrate, figure 5, column 5, lines 10-21). And Zhou et al. disclose an integrated sensor with frame memory in which a metal is used for light shield in the frame memory array (column 7, lines 14-18). Metal is a good conductor of electricity. Therefore, it would have been obvious to use this metal layer as a conductor (patterned conductive layer) for connecting the CMOS imager and other circuits on the substrate in order to reduce cost and size of the camera.

In re page 8, Applicant argues that Applicant can not find the feature “fabricating a light blocking and patterned electrically conductive layer over the array of non-volatile memory cells...” in Schmidt or Zhou, either alone or in combination.

In response, regarding claim 27, the Applicant amended claim 27 with the limitation “fabricating a light blocking and patterned electrically conductive layer over the array of non-volatile memory cells.” The Examiner considers that claim 27 as amended still do not distinguish from Schmidt patent in view of Zhou et al. patent. Schmidt discloses the photocard can be placed on a single integrated circuit, and the device fabricated using a CMOS process allows both processing devices and light sensing devices to be fabricated on a single chip (a monolithic substrate, figure 5, column 5, lines 10-21). And Zhou et al. disclose an integrated sensor with frame memory in which a metal is used for light shield in the frame memory array

Art Unit: 2612

(column 7, lines 14-18). Metal is a good conductor of electricity. Therefore, it would have been obvious to use this metal layer as a conductor (patterned conductive layer) for connecting the CMOS imager and other circuits on the substrate in order to reduce cost and size of the camera.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4-6, 8-25, 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 6,278,481) in view of Zhou et al. (US 5,909,026).

Regarding claims 1, 8, 13, Schmidt discloses a digital camera comprising a monolithic substrate (a single integrated circuit, column 5, lines 15-21); a CMOS image sensor (CMOS imager 505, figure 5, column 10, lines 26-39); a frame memory (RAM memory 515, figure 5, column 10, lines 40-48); an array of non-volatile memory cells (buffer SRAM 525, figure 5, column 10, lines 40-48).

Schmidt fails to specifically disclose a patterned conductive layer adapted to electrically interconnect areas of the monolithic substrate, the patterned conductive layer including: a level of protective material fabricated over the array of non-volatile memory cells for blocking the light received by the CMOS image sensor. However, Schmidt discloses the photocard can be placed on a single integrated circuit, and the device fabricated using a CMOS process allows both processing devices and light sensing devices to be fabricated on a single chip (a monolithic

Art Unit: 2612

substrate, figure 5, column 5, lines 10-21). And Zhou et al. disclose an integrated sensor with frame memory in which a metal is used for light shield in the frame memory array (column 7, lines 14-18). Metal is a good conductor of electricity. It would have been obvious to use this metal layer as a conductor (patterned conductive layer) for connecting the CMOS imager and other circuits on the substrate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt by the teaching of Zhou et al. in order to prevent incident light from contacting to the charge stored in the memory. This makes the deterioration of image quality due to smear and dark current is eliminated. Therefore the image quality is increased. Further, the cost and size of the camera are reduced.

Regarding claims 4, 9, 22, Zhou et al. disclose wherein the level of protective material is fabricated as part of the CMOS image sensor (column 7, lines 4-19).

Regarding claims 5, 14, 17, 24, Schmidt and Zhou et al. fail to specifically disclose wherein the level of protective material is a layer of metal fabricated as an interconnect for electrically connecting the CMOS image sensor and other circuits on the substrate. However, Zhou et al. disclose protective material is a layer of metal (column 7, lines 14-19). Metal is a good conductor of electricity. Therefore, it would have been obvious to use this metal layer as a conductor for connecting the CMOS imager and other circuits on the substrate in order to reduce cost and size of the camera.

Art Unit: 2612

Regarding claim 6, 25, Schmidt fails to specifically disclose wherein the CMOS image sensor comprises an active pixel array. However, Zhou et al. disclose an active pixel array APS 110 (figure 1A, column 3, lines 24-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt by the teaching of Zhou et al. in order to allow non-destructive readout and random access (column 1, lines 43-44).

Regarding claim 10, Schmidt discloses a micro-controller for controlling transfer image from CMOS imager to non-volatile memory unit (microcontroller 510, figure 5, column 10, lines 40-48).

Regarding claim 11, 23, Schmidt and Zhou et al. fail to specifically disclose the non-volatile stores program code information for controlling the microcontroller. However, Schmidt discloses SRAM memory 525, figure 5 (non-volatile memory) and EEPROM program memory 520 to store instructions (figure 5, column 10, lines 40-48). It would have been obvious to include EEPROM program memory 520 in SRAM memory 525 to make a single memory. This reduces the size of the device.

Regarding claims 12, 18, Schmidt discloses a digital signal processor (microcontroller 510, figure 5, column 10, lines 40-48).

Art Unit: 2612

Regarding claims 15-16, all the limitations are contained in claim 8 and 10. Therefore, see Examiner's comments regarding claims 8 and 10.

As for claims 27-28, all the limitations are contained in claim 1 and 5. Therefore, see Examiner's comments regarding claims 1 and 5.

Regarding claim 19, Schmidt discloses a digital camera comprising a single integrated circuit (a single integrated circuit, figure 5, column 5, lines 15-21); a CMOS image sensor (CMOS imager 505, figure 5, column 10, lines 26-39); an analog to digital converter (A/D conversion of the image is performed on the CMOS imaging chip 505, figure 5, column 10, lines 45-48); a frame memory (RAM 515, figure 5, column 10, lines 40-48); a data compression/decompression unit (JPEG circuit 445, figure 4, column 9, line 59 - column 10, line 5); a non-volatile memory unit (SRAM 525 figure 5, column 10, lines 40-48); a microcontroller (microcontroller 510, figure 5, column 10, lines 40-48).

Schmidt fails to specifically disclose wherein a patterned conductive layer adapted to electrically interconnect areas of the monolithic substrate, the patterned conductive layer including: a layer of protective material fabricated over the non-volatile memory unit for blocking the light received by the CMOS imager. However, Schmidt discloses the photocard can be placed on a single integrated circuit, and the device fabricated using a CMOS process allows both processing devices and light sensing devices to be fabricated on a single chip (a monolithic substrate, figure 5, column 5, lines 10-21). And Zhou et al. disclose an integrated sensor with frame memory in which a metal is used for light shield in the frame memory array (column 7,

lines 14-18). Metal is a good conductor of electricity. It would have been obvious to use this metal layer as a conductor (patterned conductive layer) for connecting the CMOS imager and other circuits on the substrate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt by the teaching of Zhou et al. in order to prevent incident light from contacting to the charge stored in the memory. This makes the deterioration of image quality due to smear and dark current is eliminated. Therefore the image quality is increased. Further, the cost and size of the camera are reduced.

Regarding claim 20, Schmidt discloses a digital signal processor (microcontroller 510, figure 5, column 10, lines 40-48); a digital to analog converter (digital to analog converter 530, figure 5, column 10, lines 40-48); an electronic view finder (monitor, column 11, line 11).

Regarding claim 21, Schmidt discloses the non-volatile memory unit (memory 515, figure 5) is fabricated adjacent to the CMOS image sensor (CMOS imager 505, figure 5).

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 6,278,481) in view of Zhou et al. (US 5,909,026) further in view of Komori et al. (US 6,255,690).

Regarding claim 2, Schmidt and Zhou et al. fail to specifically disclose wherein each memory cell is a field effect transistor with a floating gate. However, Komori et al. disclose a semiconductor integrated circuit device having a non-volatile memory circuit which is a field effect transistor with a floating gate (column 3, lines 15-21). Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt and Zhou et al. by the teaching of Komori et al. in order to reduce the cell area and to attain a high integration density (column 1, lines 55-58).

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 6,278,481) in view of Zhou et al. (US 5,909,026) further in view of Ross (US 5,241,412).

Regarding claim 3, Schmidt and Zhou et al. fail to specifically disclose wherein the protective material is polyamide. However, Ross discloses opaque material (protective material) is polyamide (figure 4, column 5, lines 45-46). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt and Zhou et al. by the teaching of Ross in order to prevent incident light from contacting to the charge stored in the memory. This increases image quality.

7. Claims 7, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmidt (US 6,278,481) in view of Zhou et al. (US 5,909,026) further in view of Kempainen (CMOS Image Sensors: ECLIPSING CCDs in Visual Information?, www.ednmag.com, October 9, 1997).

Regarding claims 7 and 26, Schmidt and Zhou et al. fail to specifically disclose wherein the CMOS imager comprises a passive pixel array. However, Kempainen discloses CMOS pixel-array construction uses active or passive pixels (page 102, third column). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Schmidt by the teaching of Zhou et al. in order to achieve high "quantum efficiency" (page 102, third column).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Luong Nguyen** whose telephone number is (703) 308-9297. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Wendy Garber**, can be reach on (703) 305-4929.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231
Or faxed to:
(703) 872 - 9314

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA. Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

LN LN
7/12/2003


NGOC-YEN VU
PRIMARY EXAMINER